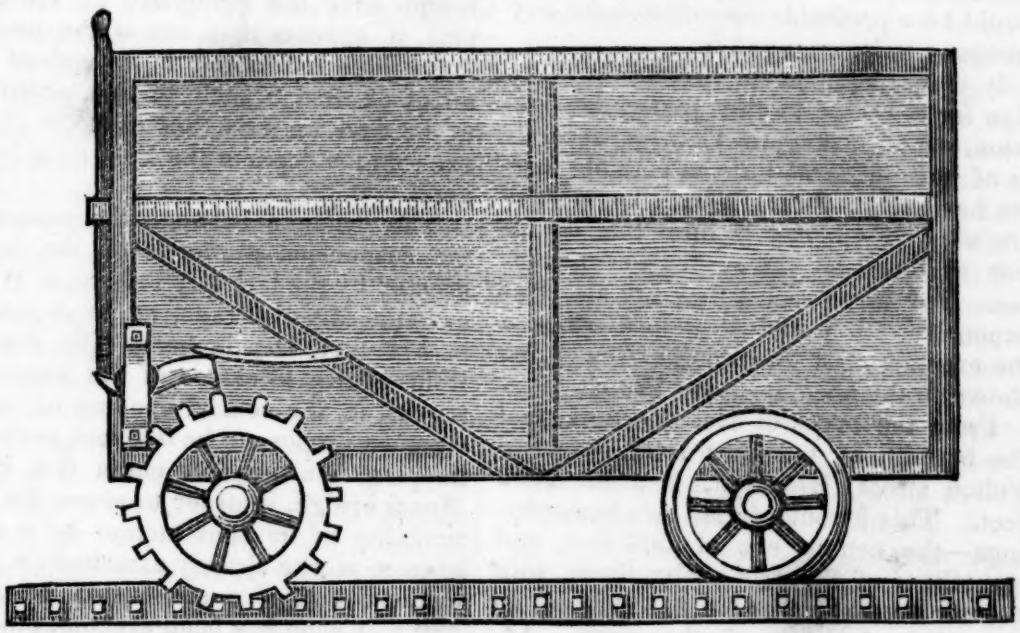
MECHANICS' MAGAZINE,

AND

REGISTER OF INVENTIONS AND IMPROVEMENTS.

VOLUME V.] FOR THE WEEK ENDING JANUARY 10, 1835. [NUMBER 1.

Improved Carriage-Stopper for Inclined Planes.



[From the London Mechanics' Magazine.]

SIR,—I am perfectly convinced of the propriety of Mr. Deakin's remarks, the value of which has induced me to forward the accompanying sketch of a stopper, to prevent the descent of carriages upon *inclined planes;* one of the advantages of which will be, that *several* of them may be introduced, if required, in the *same* train, thereby dividing the load, or *preventing danger*, if any of the coupling chains should break. The falling catch (the action of which may readily be perceived) has a spring to press it upon the wheel, and secure a correct movement. The rod behind is for the purpose of raising the catch, if not in use, as upon the levels, which may be changed by a very simple contrivance, and save the necessity of doing it by hand. The teeth of the rails would be preferable, and are designed for the inside, but are here shown for convenience of delineation. Trusting I have not trespassed upon your limits and patience, I remain, sir, your obliged servant,

JAMES WOODHOUSE.

Kilburn, Oct. 31, 1834.

Proposed Suspension Bridge between New York and Brooklyn.

To the Editor, &c.

SIR,—Having occasion to cross the East river every day, between New-York and the neighboring city of Brooklyn, I have been forcibly struck with the many inconveniences attending the present mode of communication between those cities, and have been led to consider whether some less objectionable plan could not be devised. The system of ferriage is extremely well adapted for establishing communications between places separated by a river, when the breadth of that river is so great as to render it im possible to construct a bridge over it, or when the intercourse between those places is so small as to render the con-

struction of a bridge an unprofitable speculation; but in all places where neither of these objections obtain, it ought to give way to the more perfect mode of communication afforded by permanent bridges. My object, therefore, in now addressing you, is to show, through the medium of your valuable Journal, that the construction of a permanent bridge over the East river, between New-York and Brooklyn, is not only practicable, but would be a profitable speculation for any company to be engaged in.

It is evident, that in preparing a design for a bridge in this particular situation, we must keep in view the necessity of interfering as little as possible with the navigation of the river. No bridges are so well adapted to fulfil this condition as those on the suspension principle. For large spans, they are also less expensive. I would therefore propose the erection of a *Suspension Bridge*, as shown in the accompanying sketch.

From the maps of New-York, I find the breadth of the East river, opposite Fulton street, Brooklyn, is about 2000 feet. This I would divide into five openings—the central one of 500 feet, and the others of 315 feet each; these, with the thicknesses of the piers, will make up the whole breadth of the river. According to a chart in "Blunt's Coast Pilot," the central depth of water is 5½ fathoms, or 33 feet. The height, from the under side of the road-way to the level of high water, I have taken at 70 feet: this would, I believe, be a sufficient height to allow nearly all vessels to pass under without lowering their masts, but, if not, it may be increased to the necessary height, without any other difficulty than that of increasing the expense and the ascent of the road-way, both of which it is advisable to keep down as much as is consistent with the free navigation of the river. At the proposed height of seventy feet, the uniform ascent of the road, supposing it to commence on each side at 10 feet above high water level, would be but 1 in 16⅔, which is much less than the rise given to many bridges. The breadth of the platform of the road-way I would make 34 feet, giving 12 feet on each side for a carriage way, and 10 feet in the centre for foot passengers.

In order to prove the practicability of the construction, a reference to what has already been performed in this branch of engineering will suffice. The first difficulty to be contended with is one that an engineer of ordinary practical skill will easily surmount—I refer to the laying the foundations for the suspension towers. These must be done in coffer dams, and will necessarily be attended with considerable expense. On reference to the published accounts of the bridge over the Schuylkill at Philadelphia, it appears that one of the piers of that bridge is founded in a depth of water of 41 feet 9 inches: this, according to the data we have been able to obtain, exceeds the depth of the East river by several feet.

The distance between the centres of the suspension pyramids of the bridge erected by the late Mr. Telford, in Wales, over the Menai Straits, at Ynys-y-moch, is 579 feet 10½ inches. The distance from centre to centre of the suspension towers, in the central opening of our design, we propose to be 545 feet, purposely keeping it a few feet under that of the Menai bridge, in order to prove the practicability of its construction by a reference to works already executed: it being evident, that if a suspension bridge of 580 feet span has been erected, others of less openings can also be constructed.

It was my intention, on commencing this article, to have entered more fully into the details of construction, and to have made an estimate of the expense of the bridge; but, on further consideration, I will defer this part of the subject to a future number, (if you consider the matter of sufficient importance to occupy your pages,) as perhaps some of your readers may be in possession of the correct soundings of the East river in the situation referred to; if so, and they will be good enough to favor me with them, the estimate will be made with more correctness.

It will be seen by the sketch, that I have supposed the bridge to take its rise immediately from each shore, but it is evident that a more magnificent design might be formed were we to commence the rise 1000 feet back from each shore, by the formation of a solid road-way to the water's edge; the ascent would then be but half as great, and less obstruction

would also be given to the shipping, as then the greater number of vessels might pass through the side openings without lowering their masts, whereas, in the present design, all the taller ships must pass through the central opening. This would be decidedly the best plan, and would be attended with, comparatively, little additional expense, as the span under the road-way might be appropriated for stores; but as it would require the streets at each end to be very wide, I have thought it better to give a design which is independent of this circumstance.

The rapidly increasing intercourse between New-York and Long Island will, probably, soon require the formation of a wide street leading from Broadway. What a beautiful connection would such a bridge, as is here described, form between this supposed new street and Fulton street, Brooklyn! It would altogether be one of the most magnificent suspension bridges in the world.

A design of a still more magnificent character might also be formed by extending the central opening to 1000 feet. A bridge of this span has been declared practicable by the late Mr. Telford, and some of the most scientific men in England.

I am, sir, yours, respectfully,

W. LAKE,
Civil Engineer and Architect,
23 Nassau street.

December 9, 1834.

P. S.—A drawing on a larger scale than the accompanying sketch may be seen at my office.

Surprising Swiftness.

M. Delisle has observed that a fly, so small as almost to be invisible, ran over a paper of almost 3 inches in half a second. It was so small that its feet might be reckoned to apply themselves successively upon the whole space that it ran over. And as it appeared to M. Delisle that they might be one-fourth of a line in bigness, it made in the space of a line 15 steps, or 15 motions, and, consequently, it made 540 in the space of 3 inches. How nimble must it be to remove one foot above 500 times in half a second, or more than 1,000 times in one of the common pulsations of our arteries!

[From the London Mechanics' Magazine.]

Steam-Carriage in Belgium.

ANTWERP, Sept. 28.—This day a trial was made with one of the locomotive machines which have just arrived in this country from England. It was perfectly successful. The carriage started at half past eleven, along the paved road from Antwerp to Brussels, and proceeded as far as Luytagen, where the company stopped for twenty-five minutes. At a quarter to one, the carriage had returned to Antwerp, and was running round the Place de Meir. Notwithstanding this speed, we observed that, on account of its being the first trial on our roads, the carriage was not allowed to go with any thing like the velocity of which it is capable, and we are assured that in future it will be allowed to run even much faster! All along the road the spectators, astonished at a sight so new to them, saluted the steamer with cheers and acclamations. This new carriage does not only run with extraordinary velocity, but it stops and turns and winds about in every direction with astonishing facility. This was particularly remarked during the evolutions on the Place de Meir, amidst crowds of carriages, horsemen, and pedestrians. Many persons had previously thought that the steam-carriage would be the cause of accidents by causing alarm to horses. This objection is proved to be chimerical; it was purposely put to the test in every possible manner. Horses were made to approach it in various ways, and not one, at any time, showed any symptom of fear. Both going from and returning to Antwerp the steam-carriage drew another carriage after it, full of passengers. [Mor. Herald.]—We believe the carriage here alluded to is that of Messrs. Squire and Macerone.

[From the London Mechanics' Magazine.]

Shifting Paddle-Wheel.

SIR,—I send you the accompanying plan and description of a paddle wheel for insertion in your Magazine. The intention of it is to facilitate the withdrawal, and to remove entirely the wheel from the vessel in a few minutes. It has generally been admired for its simplicity; but from my not having means to produce it on a large scale, I take this opportunity of laying it before the public, imagining

Fig. 1.

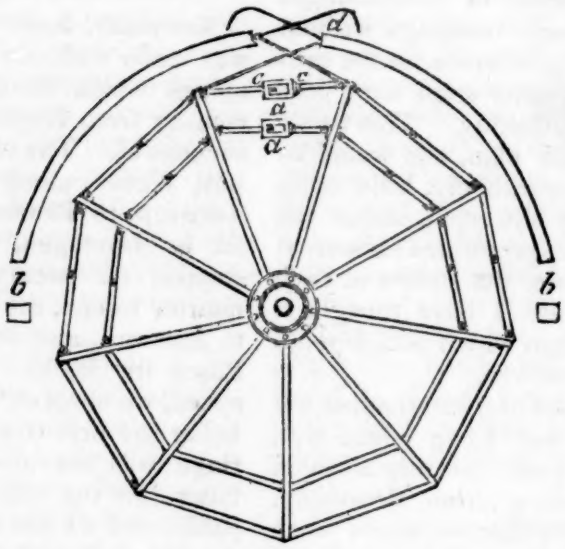
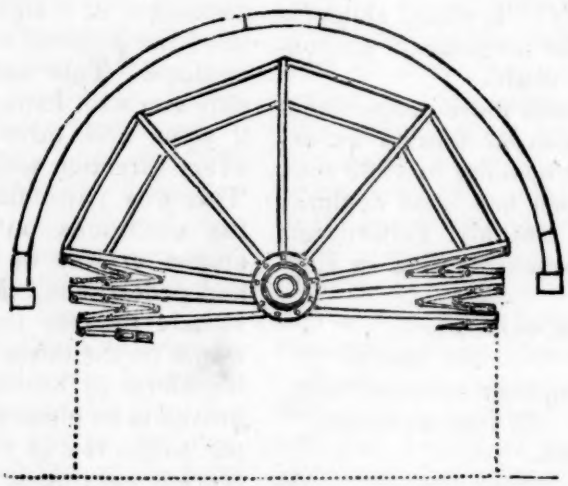


Fig. 2.



that in some cases it will be conducive to the general good.

The wheel is nearly similar to the ordinary one, with the exception of one segment of the boss being so constructed as to allow the radii arms there inserted to revolve on circular bolts, as may be seen in the upper part of fig. 1; and those revolving radii are connected by disjointed rims, which are of course flexible. The two upper radii may be separated by unscrewing the two shackle screws *a a*, which are for the purpose of bringing the moveable segment of the wheel tightly together.

Now, as the wheel is represented in fig. 1, it is connected and ready for use; and to remove it from the water, the screws *a a* are eased down, and the weight of the divided segments is allowed to come upon the tackles *c c*, which are attached to the two upper radii, and the top of the paddle box, through the two scuttles *d*. They are then lowered down upon the standing part of the wheel, and lashed thereto with chains through the scuttles *b b*. The paddle is then caused to make a demi-revolution, and is entirely withdrawn from the water, assuming the position of fig. 2.

I will now enumerate the advantages which I think would be derived from my invention.

First, should a vessel be running along a lee-shore, and an accident happen to her machinery, which renders it useless, the paddles could *entirely* be taken off the vessel in a few minutes, and she would be placed under canvass to keep her off the shore.

Secondly, should a steam-vessel be on

a long voyage when the fuel must be economised, it would be easy to take advantage of every favorable breeze; or in running down a trade wind, to consume no fuel for days together.

And, thirdly, it would be of great benefit to remove the paddles in case of exposure to ice, as in the Dutch or Russian steam-vessels, which have to encounter the destructive effects of the broken ice when the thaw commences. Or should a steam-vessel be again wanted for another Polar expedition, what an advantage it would be to her to be capable of immediately withdrawing her paddles, in case of being suddenly surrounded with ice, or again quickly applying them on meeting with clear water.

I have constructed a model with the flexible rims formed of crank chain, but which I have been advised to lay aside in favor of my original plan of jointed bars. Trusting it may be approved of,

HENRY CUNNINGHAM.

Cold Harbor, Gosport,
Sept. 15, 1834.

A Compendium of Civil Architecture, arranged in Questions and Answers, with Notes, embracing History, the Classics, and the Early Arts, &c. By ROBERT BRINDLEY, Architect, Surveyor, &c.

[Continued from vol. iv., page 327.]

ADMEASUREMENT OF ARTIFICERS' WORK.

Bricklayer.

All walling is measured by the *rod*, (272 feet,) reduced to the standard measure of 1½ brick, deducting every aperture and reveal. Chimney breasts the same, deducting only the openings; as also chimney shafts. Strings, plinths, sills, pilasters, &c. are reduced to standard measure, taken at 1½ brick.*

Ovens and *coppers* are measured as *solid* work, deducting only the ash holes; to reduce which, multiply the sum by 8 and divide by 9. Vaults, groins, domes, saloons, piers, columns, &c. are measured as solid.†

Drains and Sewers are measured by the *foot lineal*, 1s. 6d. to 20s.*

Paving with bricks by the *square yard*, 1s. to 11s.; as also *Nogging*, 2s. 6d. to 4s.; the quarters measured in.

Rubbed and *Gauged work*, laid in mortar, as returns, common foot lace, spiays, and sometimes groins, are measured by the *foot lineal*, 2d. to 9d.; but similar work set in putty, as straight, circular, and elliptical arches, fascia, Tuscan cornice, and all straight mouldings, bodies and heads of semi-circular niches, by the *foot super.*, 1s. to 8s. In brick dentil, additional measure, per *foot lineal*, 1s.; Marle Stock *facings*, per *foot superficial*,

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* Brickwork, in London, averages for labor and materials, from 16 to £18 per rod. Labor and mortar, 4 to £4 10s. Labor only 2 to £2 10s.

† Vaults are formed by arches springing from the opposite walls and meeting in a line at the top; to find the surface of which, make a line ply close to the arch from one side to the other, for the girt, and multiply it by the length of the vault for the surface; this multiplied by the arch, will give the solid content of the arch. To find the concavity of a vault, find the area of one of its ends, according to its form, whether circular, elliptical, or pointed, and multiply it by the length of the vault.

Groins are formed by the intersection of vaults with one another; and to find the surface, divide the area of the base by 7, and add the quotient to the dividend: the sum will be the area. To find the vacuity of a groin, multiply the area of the base by the height, and from the product subtract one tenth of it, which gives the solidity.

A Dome is formed by arches springing from a circular or polygonal base, and meeting in a point at the top; to find the surface multiply twice the area of the base by the height, and the product divided by the radius of the base will give the surface. To find the vacuity multiply the area of the base by two thirds of the height.

Saloons are formed by arches connecting the side-walls of a building with a ceiling or platform in the middle. To find the surface apply a line close to the arch across the surface, from the side wall to the platform, for its breadth, and measure along the middle of it, quite round the room for its length, and multiply one of these by the other to get the surface. To find the vacuity, take the perpendicular height of the ceiling, above the side wall, and the horizontal distance between them, and multiply the one by half the other. Again, measure a straight line from the top of the side wall to the edge of the ceiling, and take the distance of the arch from the middle of the line, and also the distance of the arch from the top of the side wall; and to four thirds of the distance add the straight line from the side wall to the platform, and multiply the sum by two fifths of the distance of this last line from the arch; subtract the product from the former, and multiply the remainder by the mean length round the room, taken as before. This will give nearly the part cut off by the saloon: subtract this from the whole vacuity of the room, supposing the wall to go upright as high as the ceiling, the difference will be the vacuity.

Note.—Circular walling and arches are allowed measure and a half; arches over apertures, as bridges, vaults, groins, &c. *double* measures; the tops of niches and spherical arches, *three* measures.

* Excavating for foundations, drains, &c. is charged by the *yard cube*, 8d. to 1s.; clearing away rubbish, also extra, 1s. to 4s. per *yard cube*, extending to a mile. Labor to digging and steening wells at per *foot* in depth, 3 ft. 6 in. diameter, in clear of brickwork, not exceeding 30 feet, 3s. 3d.; from 50 to 70 feet, 5s. 3d.; so on, in proportion, according to the diameter, adding 1s. per *foot* for every additional 20 feet in depth.

6d.;* *Copings*, per *foot lineal*, 5d. to 1s.; *Jointing*, including *raking* and *dubbing*, per *foot superficial*, 3d. to 7d.; *Chase cutt* and *pargetting* to chimneys, per *foot superficial*, 4d.; *Ramps*, 3d.; *Sash frames*, bedded and pointed, *each* 2s. to 3s.; also chimney pots, 1s. 6d. Claying vaults, per *yard square*, 1s. 6d.

Tiling.

Plain-tiling, from 50s. to 60s., and *Pan-tiling*, from 46s. to 45s., including laths, per *Square*.† *Barge*, per *foot running*, 3d.; as also *beam filling*, 3d.; panted T nails and hip hooks, *each* 2d.; Ovens paved with *Foot-tiles*, at per *tile*, 1s.; and if they are rubbed smooth and gauged, 6d. *per foot super.* extra. Tile paving in courts, at per *foot super.*, 7d. to 9d. Setting tiles in cement, extra per *foot super.*, 5d. to 1s. 6d. Preparing and levelling ground, charged by the day, either for brick or tile paving.

Stone-Mason.

Masonry is comprehended under *Rubble Work*, *Hewn Work*, and *Polished Work*.

Rubble of *Rough Stone-work* is measured by taking the length and height of the walls, from the foundation, deducting all apertures, and reduced to the rood of 36 square yards. Walls below 18 inches thick are reduced to one foot, and all above 18 inches to two feet thick the standard rood.‡

Chimney breasts and stormonts are m asured by adding the thickness of one haunch or jaumb to the length of the square part, and multiplying them by their external length.

Chimney stalks or shafts are measured by multiplying half the girt by the height, from the bottom of the shaft to the top of the cope. Vents or flues are measured by the foot *lineal*, from the base to the summit.

All breaks and projections are found by adding one return to the length, and multiplying the sum by the height and thickness, and reducing it to the standard of the wall.*

Rough stones more than three feet long, over apertures, forming reveals, &c. are numbered and taken according to their different lengths. Arches over cellars, &c. are taken by the girt of the soffit; and the depth of the arch stones once added for the breadth, and then by the length and thickness of the arch, and are double measure; and arches having been included in the general dimensions are to be again taken by their height, thickness, and length, and reduced to the standard of the wall.

All upright circular walls are double measure. Walls circular on one side only, are allowed one foot thick round the circular part, as double measure, and reduced to the standard of the wall, beside the solid contents of the straight part.

The rubble of stairs and landings is taken by their length, without the wall, and by their breadth and thickness, and reduced in all cases to one foot thick.

Rubble for pavement is never reckoned less than four inches in thickness.

In measuring separate pillars, when the face or front of the pillar does not exceed five feet in length, they are taken by their net height and length, and an allowance of two feet square is made for carrying up the scontion; all below this dimension have their net thickness added to the length. When the tradesman furnishes workmanship only, the dimensions are taken over both side walls and gables, and no deduction is made for voids; but when workmanship, lime, and sand, are furnished, the outside walls are measured by including the thickness of one side wall, and one half of the vacancies is deducted.

Hewn Work, or Ashlar fronts, is taken

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* All gauged work is measured with, and paid for, as common brickwork.

† Bricks and tiles are purchased by the 1000—Common Place bricks, at 30s.; good grey Stocks, 40s.; Seconds, 44s., delivered in town. Plain Tiles, 42s. per 1000; Pan Tiles, 10s. 6d. per hundred.

Duty on Bricks and Tiles.—Bricks not exceeding 10 in. long, 5 in. wide, 3 in. thick, per thousand, 5s. 10d.; bricks exceeding the above, 10s.; bricks, if smoothed or polished on one side, not exceeding the superficial dimensions of 10 in by 5 in., 12s.; bricks exceeding the above, £1 4s.; plain tiles, 5s. 8d.; pan or ridge tiles, 12s. 10d.; paving tiles, not exceeding 10 in. square, £1 4s. 2d.; bricks exceeding the above, £2 8s. 4d.; for all tiles not abovementioned, £2 8s. 3d.

‡ In some countries, however, stone walls are measured by the perch of 18 square feet of 22 inches in thickness.

* Allowances are made of 1 ft. 9 in. by length, for levelling joists; 1 ft. by 2 ft. by length, tops of side walls, skews, shafts, &c.; 9 in. square for bond timbers; 9 in. for regulates for stairs; and 1 ft. 6 in. for thin walls. These allowances must be reduced to the standard of the walls in which they are made, and rated as workmanship only.

by the extreme length and height of the different species of work, including the sides of breakers, if any. All apertures are deducted; but the breasts and checks of rybats, together with the under beds and checks of the lintel, and upper bed of the sole, including their rests, are measured and added.

The rybats of doors and windows are measured by girting from the outward angle of the reveal to the backset. *Soles* and *lintels* are taken for the length over the face of the rybats, including the projection of one end, if projected, and the girt as in rybats.

Hewn corners and *quoins* are taken by the height for the length, and mean girt for the breadth.

Skews are taken by the length and by the girt, and chimney coping by the extreme length all round; and for the breadth by girting from the vent or flue down to the chimney stalk or breast.

Architraves and rybats of windows and doors, in a hewn front, have the deductions taken over them; and such moulded architrave rybats are measured by the heights and width at top, and girted from the bottom of the check outward, to the face of the plain ashlar. The lintels are girted in the same manner, and the length is taken round their ends.

The hewn work of *arches* is measured by finding the mean height of the arch-stones, and for the length by laying the line round the middle of the face of the arch. The soffit and reveal are taken for the length round the check, and for the breadth by girting from the bottom of the check outward to the face of the arch. Both face and soffit are double measure. Arches in upright circular walls are treble measure.

Panels sunk in ashlar work, after they are included in the surface, and the edges if sunk are re-measured, and if with a moulding, are taken as moulded work.

All hewn work cut circular for skews is allowed six inches by the length for cutting.

Rustic work is first measured superficially, and the rustics re-measured.

Pilasters raised out of the solid stones, and built in courses along with the ashlar, and girted in along with the ashlar and the sunk part and edges taken over again: if fluted they are measured over again as moulded work, girting into the flutes, and over the fillets. The cabled part, if any, is allowed double measure. The bases and capitals are girted as mouldings.

Columns diminishing with a curve are allowed double measure and a half: if the neck moulding is wrought on the shaft, they are allowed three measures. When shafts are straight only two measures, and a half more, if the neck moulding is wrought on the shaft. The flutes, &c. the same as pilasters, after being taken as plain work. The bases and capitals are girted as other mouldings, with the usual allowance, with number and size of capitals.

Cornices are taken for their length at the extremities of their greatest projection; and for their breadth, by girting their mouldings, and so much of the superficies of the upper bed as is without the wall is added.

Black and dentil cornices are measured in the same manner, and have the backs and soffits of the recesses, together with the ends of the blocks and dentils added.

The *Steps* of hanging stairs, moulded or plain, are girted at their mean breadth, including both joints; and for their length, what is seen, including six inches of housing in the wall; the soffit and ends of which steps are taken over again without the walls; and the ends of both square and circular steps at their extreme breadth and depth. The joints of platts if joggled, are also taken. The skifting of hanging stairs is taken by the extreme length and breadth of the stones, including the upper edge.

The *steps* and *platts* of newel stairs are taken by girting at the mean breadth, allowing one inch overlap and their extreme length. The newels are girted round, including the backset. The curtails are taken as scribbled work, and the soffits of steps according to the kind of work upon them.

Pyramids or *Obelisks* built in courses are girted, for their length at the bottom of each course, and between the joints for the breadth, and allowed measure and a half. When they are made of one stone, they are girted, for the length at the bottom, and for the breadth by the sloping height: and if polygonal figures, the

champhers or rustics are taken over again.

In measuring cirb stones, besides the upper bed, six inches are allowed on the edge of the same work with the upper bed. *Hewn* work of every kind, as well as *coursed* or *scribbled* work, is measured by the superficial foot.

Note.—This method, as will be perceived, applies to Scotland, where the walling of buildings wholly, or nearly so, consists of stone; but it is deemed of importance to introduce it, as regulating the measurement of stone work elsewhere.

Metropolitan Method.

Ashlar-fronted walls, whether Granite, Portland, or Bath stone, are measured, deducting apertures per *foot cube*, 4s. to 5s. 6d.; all plain, circular, moulded, sunk work, &c. per *foot super.*, 8d. to 2s. 6d.; sunk joggling, throating, grooving, cutting out, and pinning into steps and landings, per *foot lineal*, 2d. to 6d.

Copings of Portland or Yorkshire stone, of 3½ inches thickness and 13 inches wide, per *foot lineal*, 8d. to 3s. 6d.; extra to return quoin stone for labor, *each*.

Window Sills, Yorkshire and Portland, per *foot lineal*, 1s. 10d. to 3s. 3d.

Portland *Balustres*, *each* 10s. to 18s.; also *half-balustres*, 9s., of whatever figure.

Paving and *Landings*, whether Yorkshire, Portland, or Purbeck, per *foot super.*, 2s. 6d. to 3s. 8d.; Portland and Yorkshire steps and channel-stones, per *foot lineal*, 1s. to 2s. 6d.; cutting holes, cramps, mortice holes, plugs, joggles, joints, &c. *each* 4d. to 1s.

Portland stone chimney-piece and slabs, from 1 to 3 inches thick, per *foot super.*, 1s. 2d. to 3s.

Slit Free stones, or Ryegate stone hearth and covings, and whole ditto, per foot super., 1s. 3d. to 2s.

Hammer dressing and tooling, per *foot superficial*, 3d. to 4d.

Purple and *Black Marble*, covings, per *foot super.*, 6s. to 8s.

Veined and *Statuary Marble*, per *foot cube*, 40s. to 70s.

Dove Marble chimney-pieces and slabs, per *foot super.*, 7s. to 10s.

Plain, sunk, moulded, circular slabs, &c., per *foot super.*, 4s. to 16s.

Mouldings, reedings, beads in panels, astragals, quirks, flutes, back joints, rabats, &c. per *foot lineal*, 9d. to 3s.

Turning pateras, per *pair*, 7s. to 10s.

Old chimneys re-set, cleaned, &c. per *foot super.*, 1s.

Grouping of figures, &c. is charged by the *foot super.*, or per *piece*.

Slater.

All slating is measured by the *square*, 40s. to 80s.

Squaring and holing slates, per 1000, 3s. 6d.

N. B.—In measuring *Slaters' work*, there is commonly an allowance of 8 or 9 inches for eaves where they are laid double; and one foot for hips.

Note.—Thatching roofs, either with reed or straw is done by the square of 100 feet, with allowances by the run for eaves, angles, and ridges.

Paver.

Paving, whether in Pebbles, Granite, Purbeck squares, Maidstone rag, &c. by the *yard square*, 4s. to 12s.; Yorkshire, Purbeck, and Moor stone, per *foot super.*, 1s. to 1s. 6d.; York curb, Granite curb, Purbeck channel, and Yorkshire ditto, per *foot running*, 1s. 2d. to 2s. 9d.; old paving re-laid, per *foot super.*, 2d.; Coal-hole plates let in, *each* 1s. 6d.

Timber.

The timber appropriated in buildings is oak and fir; of the latter there are several qualities; but the Baltic, Memel, and American red and yellow pine are the most frequently used.

The choice and selection of it is of great importance. English oak is well known for its durability: it is divided in round, square, thick stuff, and plank.

By *Round Timber* is to be understood the tree in its natural growth; and it is measured by the girt or circumference, by applying a chalk line round it, which, twice doubled, shows the *quarter girt*; and in the admeasurement multiply the mean quarter girt by itself, and that product by the length, and divide the result by 144, for the solidity in feet. Or, by the sliding rule, set the length in feet upon C, to 12 on D, against the mean quarter girt in inches on D will stand the contents in feet on C. It must be observed, if the tree taper, its girt must be taken in the middle, or half the sum of the girts at the ends. Any tree less than two feet round, or six inches girt, is not deemed timber, and must be measured as tops. In allowing for bark, oak and

elm usually have a deduction of 1 inch in the foot, from the quarter girt.

Square Timber is the full size of the tree as it grows, only having its sides squared. In measuring, multiply the breadth by the depth, both in inches, and that product by the length in feet: which divide by 144 for the solid contents.

Thick Stuff is square timber cut into different thicknesses from 10 inches down to 4½, the whole depth of the timber the other way.

Planks descend from 4 in. to 1½ in. Their superficial contents are found by multiplying their length and breadth together, and are purchased by the load, agreeably to the table which is subjoined:

Thickness of Thick stuff or Plank.	10	9	8	7	6	5	4	3	2½	2	1½
Number of superficial feet to the load.	60	66 16	74	85 72	100	120	150	200	240	300	400

The contents are found by the Sliding Rule:

As 12 on the slider is to the *breadth* on the rule, so is the length on the slider to the contents on the rule.

Oak timber, however, forms but a small portion in the building line, and good old *ship oak* is fully adequate to the purpose. Its service is confined to ground joists and sleepers, lintels, plates, quartering, sills, door-cases, brackets, barn and granary flooring, pale-fencing, &c. New oak is sometimes used for flooring, and doors to mansions, which polished have a beautiful appearance.

Memel timber is used in substantial buildings, particularly under the Carpenter's head, as naked flooring, quartering, and roofing—and with the Joiner, for flooring, stairs, frames, sashes, doors, and all external work. It is imported in *Balks* and *yellow* and *white Deals*, the average standard of which is No. 120,—12 ft. long by 9 in. wide, and 2½ in. thick to the 100. Deals run in various lengths, from 10 to 20 feet, and are described by their several thicknesses; as 1½ in. or *slit*, 3¼ in., 1 in., 1½ in., or whole 1½ in., 2 in., 2½ in., 3 in. The best floorings, however, are laid with *battens*,—deals averaging from three to six inches in width, which are considered equal to two thirds of a deal of the same length and thickness. All feather-edged deals are supposed to be *yellow* deal, and equal to 3¼ inch deal; but if *white*, equal to ½ inch or slit deal. This timber is distinguished by its knots and beautiful grain.

Baltic timber runs long, is of good quality, and consists of spars, (particularly from Riga,) appropriated for masts, scaffold poles, &c.

American red and yellow pine timber is commonly used in minor buildings: but, where subject to dampness and the effects of weather, its duration is short. In large houses, when properly seasoned, there can be no objection to its use for closet fronts, plinths, shelves, and upper floorings. This species of timber is known by its bulk, softness, and fine straight grain.

Mahogany is used for hand-rails, balustres to stairs, sashes, doors, &c. and is of two sorts, namely, Hispaniola or Spanish, the best, and Honduras, of inferior quality.

Chesnut and walnut are out of date, but admired for their durability in antique buildings.

Oak averages from £6 10s. to £7 10s. per load.

Memel timber averages from £6 10s. to £7 10s. per load.

American pine averages from £3 10s. to £4.

Sawyer's Work.

In London, square timber is measured *per load*, not exceeding four cuts in each piece of timber, 6s.; any number above is considered extra, and charged at per *hundred superficial feet*, 3s.; cross-cuts at, per number, 3d. to 6d.; deals, battens, planks, and flat cuts, at per *dozen*, according to their several lengths, 2s. 3d. to 7s. 6d.; flat cuts, per *dozen*, 1s. 4d. to 1s. 8d.; they are also tailed out at per *dozen*, 3d.

Carpenter.

Carpenters' work includes all the rough work in timber building, as oak

joists and sleepers, lintels, plates, joists, girders, bressummers, story posts, quarter partitions, whether trussed or skeleton; the entire roofing, as ties, principals,* collar beams, king posts, queens, trusses, purlins, rafters, &c. all of which are measured for materials, per *foot cube*, 7s. to 8s.; but for labor and nails, or labor only, per *square*, 6s. to 16s., in whatever form the several parts may be constructed, except eaves boards, ridge rolls, arris fillets for slates, ridge pieces, which in either case are taken at per *foot running*, 2d. to 1s.: as also battening for slates, 6d.; but boarding, per *square*, 30s. to 50s.†

Guttering, at per *foot super.*, as also *Furrings* to girders, 6d. to 1s. 4d.

Battening to walls, per *square*, 10s. to 30s.

Rain covering, per *foot super.*, 7d. to 1s. 2d.

Centering to vaults and groins, per *square*, 30s. to 50s.; to trimmers and bridgeways, per *foot super.*, 6d.; to apertures, as gauged arches, &c. per *piece*, 2d. to 4d.

Sound Boarding, per *square super.*, 30s. to 50s.

Bracketing and *Cradling*, as to entablatures, soffits, waggon-head ceilings, cornices circular and straight, coves, groins, domes, spandrils, heads of niches, &c. per *foot super.*, 7d. to 1s.

Weather boarding of every description, at per *square*, 40s. to 60s.; deal at the angles, per *foot lineal*, 3d.

Luffer boarding, with frame-work, &c. per *foot super.*, 9d. to 1s. 1d.

Mortices and *small brackets*, *each* 6d.

1 and 1½ inch *Rough boarding* under lead, per *square*, 50s. to 80s.

Cisterns and *Tanks*, per *foot super.*, 8d. to 1s. 2d.

Water trunks, per *foot running*, 1s. 3d. to 1s. 10d.

Oak plank, 1 inch to 3 inches rough wrought, &c. at per *foot super.*, 9d. to 3s

Oak trussed girders, 4 inches square, per *foot running*, 1s. to 1s. 9d.

Oak scantling, from 8 in. by 8 in. to 12 in. by 12 in. per *foot cube*, 7s. to 7s. 6d.

Kings, *each* 6s.

Wedges, per *pair*, 1s. to 4s.

Oak door-cases, single or double rebated, per *foot cube*, 8s. to 8s. 9d.

Elm, per *foot cube*, 4s. to 5s.; elm plank, 5d. to 1s. 6d.

Stabling, as flaps, linings, corn-bins, arches over heel posts, sides of mangers, wheel-boards, partitions, letter-boards, &c. per *foot super.*, 6d. to 1s. 7d.

Rims to racks, arras seed racks, top rails, straight or ramped bars, rails for harness pins, &c. per *foot running*, 2s. to 3s. 6d.

Turnings to heel posts, holes to ends of ditto, rack-staves, harness-pins, &c., *each* 4d. to 6d.

Pale fencing with oak cleft pales, Park paling with cleft plates and rails in panels, cleft oak pale-fencing with oak bottom plank, boarded pale fencing, do. posts, rails, and boards (planed) with rails in panel, capping on top of rails, &c. per *rod running*, 35s. to 70s.

Common five-bar gates, of oak, *each* 20s. to 25s.

Barn-floors, of 2-inch deal or oak plank, per *square*, £5 5s. to £5 15s.; joist, per *foot cube*, 5s.

Standard Ladders, &c. per *round*, 6d.

N. B.—All Fir used in shoring is charged one third of its value—in larger quantities, one fourth.

Joiner.

All *Flooring*, whether deal, batten oak, or right wainscot, at per *square*, 50s. to 240s.

Slit, ¾ in., 1½ in., 2 in., 2½ in., 3 in. deals, whether rough, planed on one or both sides, keyed and clamped, rebated, ledged, or battened, framed, cut circular, bent to soffits, &c. per *foot super.*, 6d. to 1s. 9d.

Dressers and *drawers*, with tops, potboards and bearers, shelves, cut standards, at per *foot super.*, 1s. to 2s.; runners, sliders, drawers, and grooves, per

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* In the construction of roofs great care should be taken, so as to avoid the heels of the principals resting on the lintels over apertures; the same with regard to the joists,—preferring at all times the solid piers as realizing greater support.

† The surface of a square roof is measured by taking twice the depth from ridge to eaves, and the depth from gable to gable. A hipped roof is measured by taking twice the depth from ridge to eaves, and the mean length between the hips; to which add the areas of both hipped ends. A pavilion square roof finishing in a front at the top, is taken by adding the length of one end and one side, at the eaves, for the length, and the depth from the ridge to eaves. A conical or turnpike roof is measured by taking the circumference at the eaves, and by the slant height.

foot running, 1¾d. to 3d.; cut brackets, *each* 6d. to 8d.

Ironing boards, at per *foot super.*, 10d. to 1s. 6d.

Linings to backs of shelves and *facia*, plowed, tongued, beaded, plugged, &c. at per *foot superficial*, 6d. to 9d.

Washing troughs, at per *foot super.*, 11d. to 1s. 6d.

Cisterns and *sinks*, per *foot super.*, 8d. to 1s.

Water closets, with seats, risers, bearers, clamped flaps, and rails, whether deal or mahogany, at per *foot super.*, 1s. to 4s.

Skirting, whether square, raking, beaded, or scribed to nosings of steps, per *foot super.*, 5d. to 1s.; *Torus skirting*, described the same, per *foot super.*, 7d. to 1s. 2d.

Plinths, per *foot super.*, 6d. to 1s.; mouldings on top, per *foot lineal*, according to girt, 4d. to 1s.

Dado, whether keyed, circular, or plain, grooved and backed, per *foot super.*, 9d. to 2s.

Wainscotting, framed of square work, flush for hangings, ovolo, ogee, panels, flat, &c. of whatever description, whole, dwarf, or raking, at per *foot super.*, 7d. to 1s. 2d.

Partitions in deal, braced, ledged, and edges shot, wrought on both sides, grooved, tongued, beaded, &c., whole deal, 1½ in. 2 in., 2½ in. deal, framed square both sides, on one side and flush the other, flush both sides, bead and flush both sides, ogee, ovolo, on one side, and square the other, &c. per *foot super.*, 7d. to 1s. 8d.

Counter fronts and *closet fronts*, with doors, &c. of whatever description, per *foot super.*, 9d. to 1s. 4d.; as also *Spandrils to stairs*, 11d. to 1s. 4d.

Chimney-fronts, framed square or flush, per *foot super.*, 7d. to 1s.

Framed grounds, per *foot super.*, 8d. to 1s. 1d.

Narrow grounds, straight, circular, or writhed, per *foot running*, 3d. to 9d.

Plain door-linings and *soffits*, double and single rebated, beaded on edge, with backings, &c. at per *foot super.*, 9d. to 1s. 4d.

Door-linings and *soffits* framed, rebated on edge, one, two, or three panelled, and moulded, per *foot super.*, 10½d. to 1s. 8d.

Back-linings to windows, tongued, panelled, bead and butt, per *foot super.*, 10½d. to 1s. 1d.

Backs, *elbows* and *soffits*, keyed, framed square, raised panels, moulded, &c. splayed, square, circular, or plain, per *foot super.*, 11d. to 1s. 9d.

Boxings to windows, splayed, proper, circular, head to bow, per *foot super.*, 11d. to 2s. 4d.

Stairs, steps, risers, and carriage, whether deal or right wainscot, with moulded nosings, close string, return nosings, risings mitred to string, &c. per *foot super.*, 1s. 2d. to 1s. 8d.; blocks to curtail step, *each* 8d.; circular veneer to riser of ditto, per *foot running*, 1s. 6d. to 3s. 9d.

String boards, raking, planed and framed, sunk and beaded, moulded and cut for steps, mitred to risers, circular, writhed, &c. per *foot super.*, 1s. 3d. to 6s.

Apron-linings, rebated and beaded, circular, per *foot super.*, 1s. 2d. to 2s. 4d.

Hand-rails to stairs, straight and moulded, circular, ramps, and knees, writh and twist, per *foot running*, 1s. to 8s.

Mahogany hand-rails to stairs, straight-moulded, ramps and knees, writh and twist, straight mahogany moulded hand rail, cross banded ramps and knees, writh, per *foot running*, 3s. 6d. to 20s.

Nutts and *screws* to joints, *each* 2s. 6d.

Warne's hand-rails, Hispaniola mahogany rail, plain, or reeded, without heading-joints, straight, ramps, swan-neck circular rails, writh, per *foot running*, 4s. 3d. to 20s.

Balustres, deal, wainscot, or mahogany, square bar, dove-tailed into steps, *per foot running*, 2d. to 7d.

Planceer, edges rounded or moulded, per *foot running*, 2d. to 3d.

Newels, square framed, per *foot running*, 6d.; turning to newels, and pendants, *each*, 10d. to 3s.

Moulded nosings and *brackets to steps*, nosings returned to ends of steps cut brackets, *per piece*, 10d. to 2s. 6d.; housings, *each* 9d. to 1s.

Columns and *pilasters*, diminished, *per foot super.*, 2s. 6d.

Flutings, *per foot running*, 3d.

Triglyphs, common modillions, *each* 8d. to 1s.

Sashes, 1¼ inch ovolo, astragal, and

hollow, octagonal figures, circular on plan, fixed, single or double, deal, wainscot, or mahogany, *per foot super.*, 8d. to 1s. 2d.; as also circular fan sashes over doors, angle-bars extra, *per foot running*, 1s.

Sky-lights, French casements, sash-frames, 1s. to 3s.

Sash frames and *sashes*, as D, C, F, O, S, S, (deal-cased frame, oak sunk sill,) 2 inch astragal and hollow sashes hung double or single, whether deal, wainscot, or mahogany pulley-weights, &c. included, *per foot super.*, 1s. 7d. to 4s. 2d.

Window-shutters, 1 in., 1½ in., ledged or clamped, square-framed, panelled, moulded, &c. in single or double heights, *per foot super.*, 9d. to 1s. 10d.

Sliding shutters, square-panelled, bead-butt, &c. *per foot super.*, 1s. to 1s. 6d.

Outside shutters, two-panel bead-butt and square, bead-flush and square, on circular plan, *per foot super.*, 1s. 4d. to 2s. 6d.

Ledged doors, wrought two sides, plowed, tongued, and beaded, *per foot super.*, 7d. to 1s. 3d.

Inch Ledged gates and warehouse doors, do. with ledges and braces, per *foot superficial*, 1s. 5d. to 1s. 10d.

Framed gates and *coach-house doors*, filled with 1½ inch battens, framed and braced, plowed, tongued, and beaded: bead-butt and square gates in 8 panels, 12 do., 16 do., &c. *per foot super.*, 1s. 9d. to 3s.; ramped tops and hanging *extra*.

Palisado gates, lower part flush, upper part filled with palisadoes—or lower part bead-butt and square, upper part filled in with bars, *per foot super.*, 2s. to 2s. 5d.

Doors of every description, single hung or folding, sash, right wainscot, mahogany, veneered or solid, *per foot super.*, 10d. to 1s. 10d.

Cornices, single, facia and cornice, &c. 5d. to 10d.

Mouldings, quirk, circular, flat sweep, quick ditto, wainscot, &c. *per foot super.*, 1s. 8d. to 6d.

Housings to base or impost mouldings, mutules or blocks, ditto with bells, Tuscan blocks, square and raking, Ionic modillions capped, ditto raking, *each* 4d. to 1s.

Moulded architraves and *surbases, common surbase, single architrave, beaded chair-rail, beaded capping, per foot running*, 2d. to 10d.

Pilasters, flutings, &c. sunk face pilasters, flutes, grooves, or square sinkings, per foot running, 1½d. to 9d.; *Reeds, each*, 1d. to 3d.

Rough-wrought and circular fillets, deal stops, wide mitred ditto, beads, circular ditto, rebated angle-staff, circular ditto, ogee, quirk ogee, cove and bead, beaded capping, astragal mitred in panels, reeds in ditto, rule joint, large joint, moulded rail and cloak pins, plain dentils, fancy ditto, *per foot running*, 1½d. to 8d.

Right wainscot, planed both sides and dove-tailed, framed, clamped, &c. *per foot super.*, 10d. to 3s. 6d.; beads, *per foot running*, 3d.

Mahogany, in shelves, plinths, seats, bearers, mitred and clamped, half-framed and beaded to narrow stiles and rails in front of book-cases, moulding, straight, circular, *per foot super.*, 1s. 10d. to 5s.

Sash-lines, *per yard*; pulleys and pins, *each*; glue, pitch, white lead, iron and lead weights, spikes, hold-fasts, and wall-hooks, *per lb.*

Clean deal, from ⅜ in. to 3 in., 7d. to 1s. 9d.; *Wainscot*, from ¼ in. to 3 in., 5d. to 3s. 7d.; *Mahogany*, Honduras and Spanish, from ½ in. to 1 in., *per foot super.*, 1s. 2d. to 3s.

All IRONMONGERY, as butts, locks, bolts, bars, sash-fastenings, &c. is taken in the admeasurement of Joiners' work, and numbered.

Carver.

The Corinthian and Composite Capital is measured by the diameter, and valued at, *per inch*, 2s. to 2s. 6d.; hence a capital 12 inches diameter is taken four times, making 48 inches; ½ and ¼ columns and pilasters, in proportion.

Plasterer.

Whiting. Lime-white, scraping, stopping old work, ceilings, compartment panes, &c. *per yard*, 1¼d. to 4d.; old plain cornice, enriched cornices and planceer, *per foot super.*, 4d. to 2½d.

Wash, stop and white in distemper, *per yard*, 4d.; ditto to cornice, planceers, and ornamental ceilings, *per foot superficial*, 1½d. to 3d.

Coloring, &c. per yard, 3d. to 6d.

Rendering, with lime or hair, set work, floated rendering and set, flat or circular, *per yard*, 6d. to 1s. 4d.; chimneys, rendered, set, and blackened, *each* 3s. 6d.

Rustics, raised, chamfered, repaired, plain raised fascia, plain key-stone, *per foot*, 6d. to 1s. 3d.

Lathing and *plastering*. Lathing only, lath and plaster, plaster set straight or circular, floated lath and plaster set, straight or circular, *per yard*, 8d. to 2s. 2d.; *ditto* spherical or to groins, *per foot;* spherical lath and plaster to heads of niches, *per foot*, 5d. to 7d.

Rough casting, on brick or laths, straight or circular, *per yard*, 1s. 6d. to 3s.

Stucco, Bastard stucco, Trowelled stucco on brick or lath, straight or circular, *per yard*, 1s. 6d. to 4s.—*add extra for dados*, 3d.; stucco groins on brick or laths, circular stucco on laths to backs of niches, &c. spherical ditto to heads of niches, *per foot superficial*, 5d. to 8d.

Stucco reveals to windows, straight or circular, *per foot running*, 4d. to 8d.

Counter and *Plaster floors*, counter-floors on reeds or laths, with lime and hair, *per yard*, 9d.; ditto with burnt plaster, 1 inch thick, plaster-flues, grey or red on reeds and laths, *per square*, 30s. to 80s.

Plain bead-quirks, cutting quirks to wood beads, straight or circular, bead and quirk, single, double, circular, elliptical, plain, *per foot running*, 1½d. to 8d.

Plain freezes and *soffits*, floated freeze or laths, floated and set, soffits on laths floated and set, straight, circular, elliptical, circular off its bead and flush, 3 panels on laths, do. ogee and bead sink 3 panel on laths, *per foot super.*, 2½d. to 1s. 6d.

Plain small mouldings, astragals or ogee, at the foot of freezes, and reed-mouldings to form panels in stucco, straight or circular, compound mouldings, from 3 to 6 inch girt, *per foot running*, 3d. to 6d.

Plain Cornices, from 6 to 9 inches girt, *per foot running*, 3½d. to 6d.; all above, *per foot superficial*, 1s.

Enrichments of cornices, enriched mouldings cast solid from 1 to 3 inch girt, enriched hollow members put up separate from 1 to 3 inches, whether straight or circular, 4d. to 1s., *per foot superficial.*

Enrichments to soffits, in cornices on ceilings cast, guilochi or gollos from 1½ in. wide to 6 in., with a single flower, *per foot running*, 5d. to 1s. 3d.; as also *frets*, *flutings*, &c.

Enrichments to friezes, soffits and strings cast from 4 to 8 inches wide, *per foot running*, 1s. to 2s.

Ornaments worked by hand, &c. as husks cast and fixed in festoons and drops, festoons to husks, indented leaves in stucco, laurel leaves and berries, oak leaves and acorns, ivy leaves and berries, vine leaves and grapes, *per foot running*, 1s. to 3s. 6d.

Foliage per foot superficial, 3s. 6d.; fan ornaments, 1s. 3d.

Roman cement. Rendering with cement, *per yard*, 2s.; setting tiles in cement, per *foot superficial*, 8d to 1s.; cement stucco on brick, plain or jointed, and colored, to imitate stone, per *yard*, 4s. 6d. to 5s. 6d.; plans, friezes, &c. jointed and colored mouldings, &c. per *foot super.*, 6d to 2s. 6d.; arrises, straight or circular, also reveals, per *foot running*, 3d. to 9d.

Hamlin's mastic cement. Plain face on brick, circular or plain, plain and circular mouldings, per *foot superficial*, 7d. to 3s. 4d.; arris, reveals, margins, fascias, per *foot running*, 3d. to 7d.

N. B.—All apertures are deducted.

Blacksmith.

Iron rails, chimney-bars, bolts, window-bars, shutter-bars, cross-bars, stays, cramps, hold-fasts, gudgeons, hoops, pump-work, casements to windows, stays, saddle-bars, pins, hooks, &c. per *cwt.* (112 lbs.), 4d. to 8d.

Iron-wrought doors, with panels, as per Act of Parliament, per *lb.*, 10d.

Ornamental Iron-work, balustres to staircases, gates, brackets, lamp-irons, &c. per *lb.*, 8d.

Cast-iron rails, per *cwt.*, 18s.; and sometimes at per *foot lineal* and per *foot superficial.*

Cast-iron columns and sash-weights, per *cwt.*, 16s. to 18s.

Plumber.

New cast sheet-lead for gutters, terraces, &c. and melted lead for ridges, per cwt., 30s. and 34s.; laying ditto, (solder and labor included,) extra, 4s.

Sash-weights, per *cwt.*, 34s.

Laying down lead flats, gutters, &c. is charged by the day.

Solder, per *lb.* 1s.

In weighing old lead, deduct 4 *lbs.* in every *cwt.*

Small cast pipes, per *foot*, 10d. to 2s.

Soldering joints of water pipes, per *joint*, 2s. 6d. to 13s.

Rain-water pipes, per *foot*, 3s. to 4s.; as also pumps, 30s. to 95s.; and funnels, 4s. to 7s.

Brass-work, stop-fire cock, per *lb.*, 1s. 8d.; stop-cocks, stop-cocks and bibbs, butts, cock-bibbs, or balls, ball-cock, ball-bosses, bosses, washers and wasters, ferrols, sockets, plugs, and strainers, buckets, shoes, and clacks, *each*, 5s. 6d. to 16s.

Elm-pipe, 4 inches, hooped and jointed, per *foot running*, 2s.

Copper covering, per *foot superficial*, and per *square superficial;* as also *wire-work.*

Glazier.

Plate glass, 1 ft. to 2 ft., from 10s. to 16s.; best Newcastle crown glass, 3s. 10d.; seconds, 2s. 6d. to 3s. 3d.; thirds, 2s. to 2s. 9d.; ground glass, 5s. 6d.; Newcastle green, 2s. 6d., per *foot superficial.*

Newcastle glass, per *foot superficial*, stopped in old sashes, 4s. 3d.; leaded lights, crown or green glass, 1s. 8d.

Quarries and squares stopped in old lights, *each*, 3d.

New leading old lights, per *foot superficial*, 9d.

Casements pinned in, *each*, 6d. to 1s.

Painter.

Painters' work is measured wherever the brush goes, and regulated in price according to the execution, whether in common oil, flatted, or varnished, and done on stucco, deal, or in distemper.

All wainscot, dado, doors, window-shutters, jaumbs, linings, mouldings, architraves, &c., by the *yard square*, from one to four times in oil; grained wainscot, mahogany, sanded, flatted, or varnished, 4d. to 3s.

Imitations of wood, marble, &c. per *foot super.*, 3d. to 1s.

Chimney-pieces, ornamented ceilings, and other enriched works, picked in, and small detached pieces, done with variegated or fancy colors, flatted, on stucco, by the *foot superficial*, 4d. to 8d.

Distemper on stucco, with enriched mouldings, per yard, 8d.

Ornamental figures, carved mouldings, cornices, fascias, skirtings, water-trunks, by the *foot running*, 1½d. to 6d.

Cornices, twice oil and flatted to four oils and flatted, dead white, 3d. to 10d.; *enriched friezes*, five times in oil and flatted, 8d.; *carved astragals*, 2 inch girt, 3d. to 3½d.; *architraves in stucco*, 2½ inch girt, five oils flatted, 3½d.; *frieze*, once in oil and flatted, and picked in with green or blue, per *foot superficial*, 4d.

Sash-frames, window-lights, casements, window sills, reveals, &c. *each*, 1s. to 2s.

Squares, 1s. to 2s. 6d.; *chequers*, 6d., per *dozen.*

Varnishing wainscoting, balustres, &c. per *yard*, 1s.; ditto squares, per *dozen*, 1s.; window-beads, per *set*, 3d.; beads and pulley-pieces, 6d.

Writing, plain or figured, sunk or shadowed letters, *each* 1d. to 1s.

Gilt letters, per *inch*, 1½d. to 2½d.

Gilding mouldings, per *foot lineal*, 4d. to 1s.

N. B.—The labor only to painters' work is taken at one third the whole amount of bill for all materials.

Note.—After the several dimensions of artificers' works have been measured and numbered according to their species, (commencing with the mason or bricklayer,) it remains for such dimensions to be reduced to standard measure, with the usual deductions, or cubed and squared: and then on a sheet of paper, (prepared with numerous perpendicular lines, half an inch apart, and each column headed with such denominations as are peculiar to the work,) to be transferred from the measuring-book in rotation—marking every dimension so taken; and when finally accomplished, the several headings are to be added up, and the quantities and numbers, so found, transferred to the bill-sheet, (marking such quantities and numbers,) the price to each article added, and the sums calculated, with the total amount and value.

It is to be observed that the prices affixed are London prices for materials and labor, taken in the extremes, and added merely as data for the young surveyor to form an idea of valuation. The method of admeasurement will ever stand good, and should be adopted universally. But as there are fluctuations in prices of materials and labor in the different countries of the United Kingdom, according to their produce of material, manufactories, and established markets, it is only experience and a thorough knowledge of customary charges, that can enable the surveyor to fix the prices to the several artificers' works. Labor prices only are estimated in the same manner.

IMPORTANT IMPROVEMENT IN THE SEXTANT.—Mr. D. Rowland, of London, has effected an important improvement in the sextant by a very simple yet ingenious contrivance. We had often heard Mr. Rowland's invention spoken of in terms of high commendation, but have had no

opportunity of bearing testimony to the merits of his truly valuable sextant, until Thursday last, when he exhibited its powers at the Plymouth Institution, at the close of the lecture. It happened that the very evening on which Mr. H. Woollcombe (the President) had obligingly made arrangements for Mr. Rowland to explain his instrument to the society, Mr. Davies Gilbert, late President of the Royal Society, honored the Plymouth Institution with his presence. The conversation which took place on the subject of the "Double Sextant" was exceedingly interesting. Mr. Gilbert, some of the members of the institution, (particularly Mr. Walker, of the Dock Yard,) and several strangers, offered their opinions on its advantages, which we think may be summed up generally under the following heads:

1st. The old sextant being limited to a range of 120, the lunar distances in the Nautical Almanac were only computed to that extent. Now, navigators know that lunar observations are of the utmost importance in long voyages by checking errors in chronometers; they consequently avail themselves of lunar observations, and prefer those taken by day, because the horizon is more distinctly seen, and the altitudes are more correctly taken, than by night. It will, therefore, be desirable to extend the distances in the Nautical Almanac, between the sun and moon, to 140 degrees.

2d. When an artificial horizon is used, no angle of altitude above 60 degrees could be taken with the old sextant; of course the latitude could not be found by a meridian altitude of the sun, if this altitude exceeded 60 degrees. By the new instrument, these difficulties vanish, since the meridian altitude of all the heavenly bodies may be taken by it when vertical and doubled by the artificial horizon.

3d. In addition to the above advantages may be added the following, namely, Since the sextant will possess a range of 240 degrees, it will of course span the visible hemisphere with the utmost ease. Now, if the dip be known, the refraction may be measured by the instrument at any place, and at any time. But this is not all: we know that our globe is not a perfect sphere, but of a spheroidal form; consequently tables for dip and terrestrial distance, if computed for a sphere, must be erroneous when applied to a spheroid. Dip for altitudes, or objects taken east or west, would differ for objects in a north or south direction, because meridians of longitude continued round the globe are elliptical, whereas parallels of latitude are a series of circles of unequal diameters. This being the case, it follows that the span of the visible hemisphere, in the direction of the earth's axis, will be different from that taken in a transverse direction. Rowland's "double sextant" would measure this difference at once, and point out a dip for each latitude, and each direction, with regard to the poles. This improved instrument may be used for ascertaining the true figure of our earth, and may either prove or disprove its form, as deduced from measured acres of its surface, or from calculations made from data furnished by the pendulum.—[Plymouth (Eng.) paper.]

LIFE PROLONGED BY CIVILIZATION.—If we collect England, Germany, and France, in one group, we find that the average term of mortality, which in that great and populous region was formerly one in 30 people annually, is not at present more than one in 38. This difference reduces the number of deaths throughout these countries from 1,900,000 to less than 1,200,000 persons: and 700,000 lives, or one in eighty-three annually, owe their preservation to the social ameliorations effected in the three countries of western Europe, whose efforts to obtain this object have been attended with the greatest success. The life of man is thus not only embellished in its course by the advancement of civilization, but is extended by it and rendered less doubtful. The effects of the amelioration of the social condition are to restrain and diminish, in proportion to the population, the annual number of births, and in a still greater degree that of deaths; on the contrary, a great number of births equalled, or even exceeded, by that of deaths, is a characteristic sign of a state of barbarism. In the former case, as men in a mass reach the plenitude of their physical and social developement, the population is strong, intelligent, and manly; while it remains in perpetual infancy, whole generations are swept off without being able to profit by the past,—to bring social economy to perfection.—[Philosophical Journal.]

METEOROLOGICAL RECORD,

Kept at Avoylle Ferry, Red River, Lou.—(Lat. 31.10 N., Long. 91.59 W., nearly.)

FOR THE MONTHS OF OCTOBER AND NOVEMBER, 1834

Date. 1834.	*Thermometer.* Morn.	Noon.	Night.	*Wind.*	*Weather, Remarks, &c.*
Oct. 1	67	74	76	SW	cloudy—heavy rain and thunder in the evening and all night
" 2	67	74	72	..	.. —heavy rain in morning
" 3	73	82	78	..	.. —showers all day and clear in the evening
" 4	73	76	73	..	.. —rain, day and night
" 5	66	68	67	..	.. .. ..
" 6	64	75	74	..	.. —clear evening
" 7	72	83	80	..	clear— .. ..
" 8	74	84	77	S	cloudy— .. at noon
" 9	70	73	71	NW	clear
" 10	54	67	65	..	..
" 11	53	76	72	calm	..
" 12	62	77	73	E	..
" 13	64	73	67	N	..
" 14	49	69	66	calm	..
" 15	51	75	69	..	..
" 16	53	81	74	E	..
" 17	69	82	79	..	..
" 18	70	86	82	NW	cloudy—rain in the evening
" 19	48	58	52	..	clear— .. ..
" 20	37	62	56	calm	.. —white frost light
" 21	44	70	68	..	.. .. ..
" 22	59	72	70	..	cloudy—clear in the evening
" 23	52	76	71	..	clear— .. .. ..
" 24	55	76	71	..	.. ..
" 25	62	80	74	E	.. ..
" 26	62	72	66	NE	cloudy— .. .. ..
" 27	64	68	64	calm	clear— .. .. ..
" 28	47	76	68	..	.. ..
" 29	52	74	74	..	cloudy— .. .. ..
" 30	66	88	78	..	.. ..
" 31	66	74	73	..	clear
Nov. 1	64	76	70	..	cloudy—clear in the morning
" 2	56	77	73	..	clear all day
" 3	60	80	74	..	..
" 4	68	77	73	SE	cloudy in the morning—clear at noon
" 5	67	82	74	calm	clear
" 6	58	72	63	..	..
" 7	48	70	64	..	..—cloudy morning
" 8	50	72	66	..	.. .. ..
" 9	52	76	66	..	clear all day
" 10	50	74	71	SE	..
" 11	62	66	64	..	..
" 12	64	72	72	..	clear in the morning—cloudy at noon
" 13	64	76	74	..	cloudy—foggy morning
" 14	68	78	72	..	.. —rain in the evening and all night
" 15	64	70	70	calm	.. —rain in the morning—clear in the evening
" 16	67	69	70	..	.. —clear in the evening
" 17	42	54	47	W	clear all day
" 18	38	52	48	calm	.. —light white frost
" 19	41	70	67	..	..
" 20	47	61	58	..	..
" 21	44	72	67	..	..
" 22	66	68	64	NW	cloudy—clear in the evening
" 23	40	57	51	..	clear all day
" 24	44	48	47	calm	cloudy all day
" 25	40	50	44	NW	clear all day
" 26	26	52	47	N	..—heavy white frost
" 27	28	51	56	E	cloudy—rain at night
" 28	51	60	62	SE	.. —rain, morning and noon
" 29	52	62	54	..	clear all day [perfectly calm & clear
" 30	53	68	54	calm	..—the Eclipse showed to the extent of calculation, the day being

Red River fell in the month of October, 5 feet 2 inches; below high water 25 feet 8 inches.
.. .. .. November, 4 .. 3 .. ; .. 29 .. 11 ..